

THURSDAY, JANUARY 10, 1878

THE SALARIES OF THE OFFICERS IN THE
BRITISH MUSEUM

THE inadequacy of the salaries of the officers of the British Museum has long been a standing grievance. It is manifestly impossible to give any valid reasons why the literary and scientific men of this great national establishment should not receive emoluments at least equal to those granted in the ordinary branches of the Civil Service. The obstinacy of the trustees in clinging to obsolete principles of priority, and in endeavouring to keep entirely in their own hands the right of nomination to all the more important posts, has, no doubt, been the main cause why the Treasury have until recently refused to do justice to a most meritorious and ill-treated branch of the public service. From the "Correspondence between the Trustees of the British Museum and the Treasury," which has lately been issued as a Parliamentary Paper, we are glad to find that in this instance, as on former occasions, the present Ministry has been induced to do justice where their predecessors in office have persistently ignored righteous claims. After a long correspondence, commenced in May, 1876, and extending over some fifteen months, it seems to have been finally settled that the salaries of the keepers of the various departments shall be raised to 750*l.* per annum after five years' service, instead of stopping at 600*l.*, the former limit, and that the salaries of the assistant-keepers shall rise to 600*l.* after five years' service, instead of being restricted to 450*l.* as heretofore. The assistants in the various departments will, in future, be divided into two classes, the first, or upper class, with salaries commencing at 250*l.* per annum, and rising by annual increments of 15*l.* to 450*l.*; those of the second, or lower class, commencing at 120*l.*, and rising by increments of 10*l.* to 240*l.* This will create a considerable general improvement in the position of these subordinates, of whom the junior assistants, as they are called, have hitherto commenced at 90*l.*, and the senior assistants have never risen beyond 400*l.* But the trustees have agreed to regard the new second class for the future as an "educational class," from which those persons who show special aptitude for the work of the different departments may be promoted to the first class, whilst those who have no extraordinary abilities must remain content with the maximum salary of the lower class. Another concession that the trustees have been compelled to make in order to obtain the above-mentioned advantages is a reduction in the number of the assistants of the upper class. The Treasury justly point out to the trustees that the scheme of having a first class of assistants double the number of that of the second class, is "inconsistent with all ordinary classification," and that the comparative numbers of the two classes "ought to be exactly reversed." This the trustees have, as it appears, somewhat unwillingly undertaken to effect, by a gradual reduction of the number of first-class assistants as vacancies occur, and by making all future appointments into the second class, except when "an opportunity occurs of securing the services of a person possessing very special qualifications."

A third point which the trustees "are prepared to reconsider" is the number of keeperships, now amounting to thirteen, and in order that the Treasury may have greater control in this matter, they have undertaken not to fill up any keepership which may hereafter become vacant, "without the previous concurrence of the Treasury." A still more important proposal made by the Treasury and "conceded by the trustees," is that the position of keeper should be considered as a "staff appointment, to which no officer within the Museum should have any right of succession by seniority." This "concession" will, we trust, do away with the practice of putting round men into square holes, in order to obtain for them an additional salary, which in former years has, we fear, been followed in some instances at the British Museum.

One remaining point, which has much exercised the well-known economy of the Secretary of the Treasury, we are pleased to see he has been obliged to give up. It was proposed that the keepers who occupy the residences attached to the British Museum ought to give up a certain portion of their salaries in lieu of rent. In reply to this ingenious suggestion, the trustees very justly urge that those keepers who reside on the premises have important duties to perform, in having to take in turn the general charge of the whole museum under the principal librarian, for which the accommodation of a residence is no more than a fair equivalent. This contention was ultimately allowed to prevail, and on the whole, we think, there is every reason to be grateful to the Government for the improvements effected by the new scheme in the position of the *employés* at the British Museum. Even in these hard times it cannot be said that a place of 750*l.* per annum with a good residence attached and a pension in future when work is no longer possible, is not such a prospect as may well attract some of the cleverest youths of the period who have a leaning towards literature or science to seek the place of "junior assistant" in the British Museum.

JULES VERNE

Hector Servadac, or the Career of a Comet.—*From the Earth to the Moon.*—*Around the Moon.*—*Twenty Thousand Leagues under the Sea.*—*Around the World in Eighty Days.*—*The Fur Country.*—*A Winter amid the Ice, &c., &c.* (London: Sampson Low and Co.)

THESE remarkable works, which we owe to the genius of Jules Verne, the first-named being that which has last appeared, are well deserving of notice at our hands, for in the author we have a science teacher of a new kind. He has forsaken the beaten track, *bien entendu*; but acknowledging in him a travelled Frenchman with a keen eye and vivid imagination—and no slight knowledge of the elements of science—we do not see how he could have more usefully employed his talents. He will at once forgive us for saying that when we compare his romances of the ordinary type, such as "Martin Paz," with those we have given above, we think that he, as well as his readers, is to be congratulated upon the new line he has opened out.

There have been many books before his time in which the interest has centred in some vast convulsion of nature, or in nature generally being put out of joint, but in these

there has been no attempt made to reach the *vraisemblable*; indeed in most cases there has not been sufficient knowledge on the part of the author to connect his catastrophe either with any law or the breaking of one. But with Jules Verne for once grant the possibility of his chief incident, and all the surroundings are *secundem artem*. The time at which the projectile was to be shot out of the columbiad towards the moon was correctly fixed on true astronomical grounds, and the boy who follows its flight will have a more concrete idea of, and interest in, what gravity is and does, possibly, than if he were to read half-a-dozen text-books in the ordinary way. Once grant the submarine vessel and the use made of electricity, and the various scenes through which the strange ship passes are sketched by no 'prentice hand. To take the most extreme case, if it be possible to imagine one in such a connection—Algeria torn from the earth by a comet and started on an orbit of its own; the astronomical phenomena have been most carefully thought out, and children of larger growth will, if they choose, find much to learn as well as to amuse them. Indeed it is very rare that one finds our author tripping in such matters, although he does sometimes. One case that occurs to us is when, in the "Fur Country," he refers to the midnight sun touching the edges of the western horizon without dipping beneath it, and even this may be due to the translator, for we have not the original French edition to refer to.

Thus much premised let us see how, in "Hector Servadac," his last work, the author attempts, as part of his task, to inculcate scientific truths, remarking that his plot is carefully kept out of view till the end of the volume. He and his faithful servant are stunned by a crash, in which the earth groaned as if the whole framework of the globe were ruptured, while the sea and air became one, and both glowed in a radiance intenser than the effulgence of the northern lights. In the midst of a gigantic earthquake-wave he found the moon's disc becoming much larger than it was before, and a new blazing star appearing suddenly in the firmament. Strange to say watches, which are not stopped, mark two as the sun rises in the west! Next point. Their respiration became more forced and rapid, like that of a mountaineer when he has reached an altitude where the pressure of the circumbient air has become reduced; when they jump they fly. The horizon is contracted. There are more surprises: a strange body (the retreating earth) seems to contend in splendour with the sun; but the true condition of affairs has not revealed itself yet, for he is anxious to go and look for his fellow-men; *en attendant*, however, they must eat.

"By jingo!" he exclaimed, 'this is a precious hot fire.' Servadac reflected. In a few minutes he said:—

"It cannot be that the fire is hotter, the peculiarity must be in the water."

"And, taking down a centigrade thermometer which he had hung upon the wall, he plunged it into the skillet. Instead of 100°, he found that the instrument registered only 66°."

"Take my advice, Ben Zoof," he said; 'leave your eggs in the saucepan a good quarter of an hour.'"

So much for the careful treatment of the first forty pages. At last the truth dawns upon Hector, and he finds others on the newly torn-off fragment, including even the very astronomer who predicted the comet.

A new point in favour of the metric system is here introduced; for our astronomer, anxious to determine the density and mass of *Gallia*, as the fragment had now been named (this is more pardonable than Gallium), finds that not only the metre of the archives, but all other measures whatever had disappeared. He shows that—

10	5-franc pieces	37 mm.	in diameter
10	2-franc "	27 mm.	"
20	50-cent. "	18 mm.	"

exactly make a metre.

A German Jew (M. Verne has his ideas of the different nationalities) is made to lend this sum at an enormous rate of interest, and the experiment proceeds.

"By the appointed time the engineer had finished his task, and with all due care had prepared a cubic decimetre of the material of the comet.

"Now, gentlemen," said the Prof. Rosette, 'we are in a position to complete our calculations; we can now arrive at *Gallia's* attraction, density, and mass.'

"Every one gave him their complete attention.

"Before I proceed," he resumed, 'I must recall to your minds Newton's general law, "that the attraction of two bodies is directly proportional to the product of their masses, and inversely proportional to the square of their distances."

"Yes, then," continued the professor, 'keep—'

"Yes," said Servadac; 'we remember that.'

"Well, then," continued the professor, 'keep it in mind for a few minutes now. Look here! In this bag are forty five-franc pieces—altogether they weigh exactly a kilogramme, by which I mean that if we were on the earth, and I were to hang the bag on the hook of the steel yard, the indicator on the dial would register one kilogramme; this is clear enough, I suppose?'

"As he spoke the professor designedly kept his eyes fixed upon Ben Zoof. He was avowedly following the example of Arago, who was accustomed always in lecturing to watch the countenance of the least intelligent of his audience, and when he felt he had made his meaning clear to him, he concluded that he must have succeeded with all the rest. In this case, however, it was technical ignorance, rather than any lack of intelligence, that justified the selection of the object of this special attention.

"Satisfied with his scrutiny of Ben Zoof's face, the professor went on:—

"And now, gentlemen, we have to see what these coins weigh here upon *Gallia*.'

"He suspended the money bag to the hook; the needle oscillated, and stopped.

"Read it off!" he said.

"The weight registered was one hundred and thirty-three grammes.

"There, gentlemen, one hundred and thirty-three grammes! Less than one-seventh of a kilogramme! You see, consequently, that the force of gravity here on *Gallia* is not one-seventh of what it is upon the earth!"

"Interesting!" cried Servadac, 'most interesting. But let us go on and compute the mass.'

"No, captain, the density first," said Rosette.

"Certainly," said the lieutenant; 'for, as we already know the volume, we can determine the mass as soon as we have ascertained the density.'

"The professor took up the cube of rock.

"You know what this is," he went on to say, 'You know, gentlemen, that the block is a cube hewn from the substance of which everywhere, all throughout your

"On this subject an amusing anecdote is related by the illustrious astronomer himself. One day, just after he had been alluding to this, as his usual habit, a young man entered the room, and feeling sure the lecturer knew him well, saluted him accordingly. 'I regret I have not the pleasure of your acquaintance,' said M. Arago. 'You surprise me,' replied the young student. 'Not only am I most regular in my attendance at your lectures, but you never take your eyes off me from the beginning to the end.'"

voyage of circumnavigation, you found Gallia to be composed—a substance to which your geological attainments did not suffice to assign a name.'

"The professor took the cube, and, on attaching it to the hook of the steel yard, found that its apparent weight was one kilogramme, and four hundred and thirty grammes.

"Here it is, gentlemen; one kilogramme, four hundred and thirty grammes. Multiply by seven; the product is, as nearly as possible, ten kilogrammes. What, therefore, is our conclusion? Why, that the density of Gallia is just about double the density of the earth; which we know is only five kilogrammes to a cubic decimetre. Had it not been for this greater density, the attraction of Gallia would only have been one-fifteenth instead of one-seventh of the terrestrial attraction.'

"The professor could not refrain from exhibiting his gratification that, however inferior in volume, in density, at least, his comet had the advantage over the earth."

We have given this long extract to show the pleasant way in which, in this latest form of French light literature, amusement is combined with instruction. It would not be fair to the book to say more of the plot or of the dénouement.

We have dwelt especially upon Jules Verne's latest book, but equal praise must be given him for all those we have named. A boy, for instance, who had read how the frozen island in the "Fur Country" was kept together by Dr. Black's device, would at once understand the *rationale* of Pictet's and Cailletet's recent splendid work, to say nothing of the physical geography he would have gradually absorbed in following the strange adventures recounted in that volume.

We are glad to have such books to recommend for boys' and girls' reading. Many young people, we are sure, will be set thirsting for more solid information.

OUR BOOK SHELF

The Geometry of Compasses; or, Problems Resolved by the mere Description of Circles, and "the Use of Coloured Diagrams and Symbols." By Oliver Byrne. (London: Crosby Lockwood and Co., 1877.)

THIS is only our old friend, "La Geometria del Compasso di Lorenzo Mascheroni" (Paris, 1797), decked out in the manner we have indicated in the quoted portion of the title. The order of sequence has been departed from, but this is not a material point. The constructions are the same and the proofs the same with, we believe, one exception, in which case we give the preference for simplicity to Mr. Byrne.

There are twenty problems, which are in most cases given in duplicate, first construction and figure in colours, then proof and unadorned figure on the next two pages.

The merits and nature of Mascheroni's work are well known; hence the present work, for reasons given above, is good. But we cannot call this Mr. Byrne's book. Problem XX., which is the last, is an elegant construction for dividing the circumference into seven equal parts by plane geometry. But for this the compiler is indebted to an able mathematician, Dr. Matthew Collins. The book is very neatly and correctly got up, and for frontispiece has a hand with a pair of compasses transferring a given length.

Proceedings of the American Philosophical Society. Vol. xvi., No. 99. January to May, 1877.

PROF. COPE has several noteworthy papers in this part: one, on the Batrachia of the coal-measures of Ohio, describes the new genus, *Ichthyanthus*, and the new species of

Leptophractus and Tuditanus. He also describes remains of a Dinosaurian from the trias of Utah; the humerus is one of the longest, and distally the most contracted known in the group. These remains are the first discovered fossils in the triassic beds of the Rocky Mountain regions. Another valuable paper is on the brain of Coryphodon. One of the longest contributions will be much esteemed by geologists, viz., Mr. Ashburner's measured section of the palæozoic rocks of Central Pennsylvania (Huntingdon County), a section extending vertically through 18,394 feet. A very valuable series of physiological experiments is recorded in a paper by F. L. Haynes, on the asserted antagonism between nicotine and strychnia. Philology is well represented by a paper on the Timucua language, by Mr. A. S. Gatschet; this language, formerly spoken in Florida, appears to be the oldest within the American Union of which writings of some extent are preserved.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

The Radiometer and its Lessons

WITH reference to the controversy between Mr. Stoney and Mr. Osborne Reynolds about the laws of the conduction of heat in gases, it seems desirable to call the latter gentleman's attention to the fact that neither Clausius' nor Clerk Maxwell's investigations, as published in the *Philosophical Magazine*, affect the controversy between them.

The latter, in his papers in the *Philosophical Magazine*, vol. xxxv., lays particular stress upon the fact that he supposes the motions of the molecules to be uniformly distributed in every direction. He says, however, on page 188: "When one gas is diffusing into another, or when heat is being conducted through a gas, the distribution of velocities will be different in the positive and negative directions instead of being symmetrical, as in the case we have considered." From this theory of the uniform distribution of velocities he deduces the formula (29), (31), and (32), as he numbers them, and to which he subsequently refers. On page 214 he gets an equation (143) which represents the transference of heat through the medium, and says: "The second term contains quantities of four dimensions in $\xi \eta \zeta$, whose value will depend upon the distribution of velocity among the molecules. If the distribution of velocity is that which we have proved to exist when the system has no external forces acting on it, and when it has arrived at its final state we shall have by equations (29), (31), (32) . . . certain results from which he deduces his equation for the conduction of heat in gases.

When he says "has arrived at its final state" it is evident from his reference to the equations that he means the state of a gas in which neither diffusion nor conduction of heat nor currents of any kind are going on. It will thus be seen that his final result is only a first approximation and could not possibly be expected to hold within distances comparable with the mean length of the path of a molecule between two encounters.

Clausius in his paper as translated in the *Philosophical Magazine* for June, 1862, does suppose a distribution of velocity among the molecules of such a kind that the velocity and number of molecules moving in the positive and negative directions is different, but assumes the mean between them to be the same as the number moving in a direction normal to the direction of the transference of heat. This is evident from the fact that what he practically does is to assume that the number of molecules moving in a direction making an angle θ with the direction of transference of heat can be expressed by a formula of the form—

$$n = n_0 (1 + e \cos \theta),$$

for he neglects e^2 throughout his investigation. In this form it is evident that n_0 is the number when $\theta = \frac{\pi}{2}$ and is the mean of the values $n_1 = n_0 (1 + e)$ and $n_2 = n_0 (1 - e)$, which represent the numbers going towards and from the points of high tempera-